

REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-4, 7-12 and 26 are presently active; Claims 13-25 and 27 have been withdrawn from consideration, and Claims 1, 3, 11, and 26 have been presently amended. Claims 5 and 6 have been presently canceled without prejudice. No new matter has been added.

In the outstanding Office Action, Claims 1, 3-8, and 26 and 26 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Katakabe et al (U.S. Pat. No. 6,745,784) in view of Oh (U.S. Pat. No. 6,751,824). Claims 2 and 9-12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Katakabe et al and Oh in view of Mandal et al (U.S. Pat. No. 6,770,424).

Claim 1 defines a rinse solution nozzle assembly includes a first nozzle array including at least one nozzle, having a central axis disposed over a center of the substrate, and configured to dispense the rinse solution substantially near a center of the substrate, a first control valve coupled to the first nozzle array and configured to actuate a first flow rate of the rinse solution through the first nozzle array, a second nozzle array including a plurality of nozzles and configured to dispense the rinse solution across a radial span of the substrate on a side of the substrate facing the first nozzle array, and a second control valve coupled to the second nozzle array and configured to actuate a second flow rate of the rinse solution through the second nozzle array. As presently clarified, Claim 1 further defines a cross-connect supplying the rinse fluid to the first control valve and to the second control valve, as shown in Applicant's Figure 4.

M.P.E.P. § 2143 requires for a *prima facie* case of obviousness that the prior art reference (or references when combined) must teach or suggest all the claim limitations. The

Advisory Action indicates that features previously argued with regard to Katakabe et al's use of different solutions were not given patentable weight as the arguments did "not provide structural limitations to the apparatus." The clarification of the present amendment provides a structural feature relevant to Katakabe et al's use of different solutions and relevant to the present invention's capability to provide the illustrative rinsing conditions as shown in Applicant's Table III in order to provide a hydraulic force to the entirety of the substrate during substrate rotation. See Applicant's specification pages 11-12.

The outstanding final Office Action acknowledges that Katakabe et al do not "specifically disclose having valves in connection with the fluid supplies and nozzles." The final Office Action thereafter asserts that valves are well known in the art. Yet, Applicant submits that the arrangement of the first and second control valves and the cross connect (defined in the claims to supply the rinse fluid to a first control valve actuating a first flow rate through the first nozzle array and to a second control valve actuating a second flow rate through the second nozzle array) is not well known in the art or made obvious in view of the applied references.

Katakabe et al show the supply of different solutions both to nozzles 14 and 16 in Figure 1 and to nozzles 24 and 26 in Figure 2. Hence, without the teachings of the present invention to show the advantages of supplying a rinse fluid both to a central nozzle and to an array of radially-extending nozzles, one of ordinary skill in the art would have no motivation to modify Katakabe et al to add the claimed cross-connect supplying the rinse fluid to a first control valve actuating a first flow rate through the first nozzle array and to a second control valve actuating a second flow rate through the second nozzle array, as defined in the present invention.

The deficiencies in Katakabe et al are not overcome by Oh. The "valve" teaching in Oh (which the Office Action relies on) is a *singular valve* that cuts off or on a supply of water to

injectors 4a and 4b. Oh does not provide a teaching of *a first control valve* configured to actuate a first flow rate of the rinse solution through the first nozzle array and *a second control valve* configured to actuate a second flow rate of the rinse solution through the second nozzle array. Oh does not disclose or suggest the claimed cross-connect supplying the rinse fluid to a first control valve and to a second control valve. Moreover, Applicant submits that the teaching of Oh to avoid irregular water screens *teaches away* from the present invention. For instance, Oh disclose at col. 2, lines 5-25, that:

However, the water screen formed on the wafer can become irregular due to variations in the position and the ejecting pressure of the injector nozzles 5a and 5b. Accordingly, contact between the brush 6 and the wafer 7 can become unstable. As a result, the surface of the wafer can become damaged partly by excessive contact force between the brush 6 and the wafer 7. Alternatively, the particles might only be partly removed because of lack of contact between the wafer 7 and the brush 6, thereby deteriorating the product and its reliability in process.

* * *

The present invention is therefore directed to a cleaning apparatus for a semiconductor wafer which substantially overcomes one or more of the problems due to the limitations and disadvantages of the related art.

It is an object of the present invention to provide a wafer cleaning device in which a brush is integrally formed with a nozzle that supplies pure water, to form a uniform water screen on the surface of a wafer, so that particles on the wafer can be entirely removed.

Hence, Oh in teaching to provide a uniform water screen teaches away from the configuration of the present invention utilizing both separate flow control valves and a cross-connect supply which can provide the rinse solution to different parts of the wafer being rinsed. Moreover, modifying the rinse assembly of Oh to have these features would render Oh unsatisfactory for its intended purpose of not having the brush disclosed therein damage the surface of the wafer form irregular injection of the rinse fluid. Thus, a modification of Oh to include the claimed feature of a cross-connect supplying the rinse fluid to a first control valve and to a second control valve is improper as detailed in M.P.E.P. § 2143.01 V.

Hence, a combination of Katakabe et al and Oh would not produce the claimed invention without further improper modifications based on improper hindsight reconstruction of the present invention. Accordingly, there exists no suggestion or motivation in Katakabe et al or Oh for one of ordinary skill in the art to add to the disclosed rinse assemblies therein the claimed cross-connect supplying the rinse fluid to a first control valve actuating a first flow rate through the first nozzle array and to a second control valve actuating a second flow rate through the second nozzle array, as defined in the present invention.

Lastly, the deficiencies in Katakabe et al and Oh are not overcome by Mandal et al, relied on in the final Office Action for its teaching of a controller controlling wafer rotation.

Hence, independent Claims 1, 11, and 26 (and the claims dependent therefrom) are believed to patentably define over Katakabe et al and Oh and Mandal et al.

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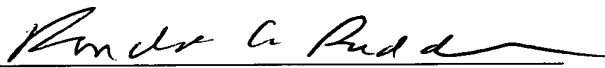
Reply to Office Action of February 24, 2006 and the Advisory Action of May 11, 2006

Consequently, in view of the present amendment and in light of the above discussions, the outstanding grounds for rejection are believed to have been overcome. The application as amended herewith is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.

Customer Number
22850


Edwin D. Garlepp
Registration No. 45,330
Attorney of Record

Ronald A. Rudder, Ph.D.
Registration No. 45,618

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 08/03)
GJM:RAR:clh

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